ERIC Document Resume	See Instruction Sheet	DATE OF RESUME 7/3/65	DATE RECEIVED

A. PUBLICATION DATA

1. ERIC NUMBER	2. ORIGINATOR CONTROL NO(S).	3. IDENTIFICATION NO.	DO NOT WRITE IN SPACE BELOW
ED000867	3412		

4. AUTHOR(S):
N A.

5. TITLE OF DOCUMENT ABSTRACTED:
The College Plan: The College of Quantitative Studies

6. PUBLICATION TITLE:
N.A.

7. EDITOR(S):
N.A.

8. PLACE OF ORIGIN:
ORG. Wesleyan University
ST. Middleton, Connecticut
CITY, STATE

9. PUBLISHER OR SOURCE
Wesleyan University

10. VOL.	11. PAGES	12. MO./YR.	13. TOTAL PP.
N.A.	N.A.	Mar. 63	7

TELE. EXT.
INST/LOC CODE

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TYPE OF REPORT
PROPOSAL ☐
IN-PROGRESS ☐
FINAL ☒
FOLLOW-UP ☐

OTHER ERIC REFERENCES:

ERIC SATELLITE CODE

B. INDEXING DATA

14. SUBJECT AREA

15. TYPE OF ENDEAVOR
report.

16. INDEXING TERMS (6-12)

grouping S-06	teaching meths. Y-25	mathematics O-11	science Y-04
students Y-15	programs P-22	physics P-13	evaluation G-19
indep. study S-14	specialization Y-11	natural science O-17	required courses P-36
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17. ABSTRACT (MAX. 250 WORDS)

Describes one of the "college" programs at Wesleyan University which departs from the usual conventions of a major program to offer a student greater independence in carrying out a course of study suited to his individual interests and needs. In these programs the students within each "college" are united principally in their intellectual goals, since the "colleges" serve only incidentally and marginally as social units.

The College of Quantitative Studies, described here, is concerned with those areas of knowledge and inquiry which are essentially quantitative in nature. Compared to customary disciplines, its concerns are mathematics, most of the physical sciences, and many areas of the life sciences and economics.

Students accepted for the program usually enter the "college" in the sophomore year. Selection is based more on strengthn of interest, maturity of purpose, and self-discipline than on high native ability. With guidance from the directors of studies, each student plans his own program of study, a program which is general in the sophomore year and becomes more specific and focused in the later years. In carrying out his program, the student is relieved of many of the traditional academic requirements concerning numbers and types of course, course credits, and grades. His achievement is measured through reports from the student himself and from his instructors and through his performance on the Junior Qualifying Examination and Senior Comprehensive Examination.

ERIC No.

18. SOURCE OF ABSTRACT

C. FUNDING DATA

19. SUPPORTING ORGANIZATION	20. DIVISION OR DEPT.	21. CONTRACT NO. / PROJECT NO.
	22. TOTAL COST OF PROJECT	
	23. DURATION OF PROJECT	U.S. Department of Health, Education, and Welfare Office of Education

R-7 -14 Also: 5 (Hum), 11, 15, 21 8412

Rel Oct 63

WESLEYAN UNIVERSITY

THE COLLEGE OF QUANTITATIVE STUDIES

The College Plan

In an effort to increase the effectiveness of a liberal education, and to preserve the characteristic virtues of a small college while growing in size, Wesleyan University offers special programs known as "Colleges." These depart from the usual conventions of a major program to offer a student greater independence in carrying out a course of study suited to his individual interests and needs. The Plan has as its goals

(1) to foster the unity of students and faculty in a common enterprise, that of preparing the students for their careers as self-educating adults;
(2) to involve the student actively in planning and pursuing his own education;
(3) to encourage independent inquiry by students, with a degree of guidance adapted to the needs of the individuals;
(4) to provide opportunity for students to integrate traditionally separate disciplines, and to understand the relation of theory and practice in complex human situations.

The students within each College are united principally in their intellectual goals, since the Colleges serve only incidentally and marginally as social units.

Above all, the initiative for his education lies with the student. The acceptance of this responsibility is a prerequisite for participation in the College programs. For those who have undertaken it seriously, such responsible independence has been a source of deep satisfaction.

The CQS Program

The Program Generally

The College of Quantitative Studies (CQS) is concerned with those areas of knowledge and inquiry which are essentially quantitative in nature. In terms of the customary disciplines, Mathematics, most of the Physical Sciences, and many areas of the Life Sciences and Economics are within its concerns.

A student with a principal interest within the above areas, who is satisfied that the CQS program is better suited to his needs than a traditional major program, normally applies for admission to the College at the end of his Freshman

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year. After interviews with the Directors of Studies in further exploration of the student's plans and the College program, he may be accepted and enter the College in the Sophomore year.

Students are chosen for their strength of interest and for maturity of purpose and self discipline, rather than primarily for high native ability. Some of the students would traditionally have majored in mathematics; others in a Science. Many come from the fairly large group with interests sufficiently diverse so that none of our traditional major programs has been satisfying.

With guidance from the Directors of Studies, each student in CQS plans a program of study covering the three aspects of his education:

(1) his principal interest, the central part of his major study;
(2) his supplementary interest, in a related field;
(3) his generalization, in a field of his interest outside his specialization and humanistic in nature.

The student's progress and his plans are reviewed from time to time with the Directors of Studies, and the program which is general in the Sophomore year becomes more specific and focused in the later years.

In carrying out his program, the student is relieved of many of the traditional academic requirements concerning numbers and types of courses, course credits and grades. Instead, his achievement is measured relative to the program he has set himself through reports from the student and his instructors, and through his performance on the Junior Qualifying Examination and Senior Comprehensive Examination set by outside examiners.

With the aim of broadening the student's education beyond the usual classroom course, efforts are made

(1) to introduce students to "real," as contrasted with "text-book" problems early in their careers, and to key their study to the solution of such problems through organized projects, and by problem work incidental to courses;
(2) to ensure that summers be used in small or large part to continue study, to prepare for the next year, and to work on projects. A change of pace from the academic year is essential, but a complete lapse may be unwise;
(3) to let students participate in the teaching of others, as through freshman problem sessions, machine programming, participation in symposia, and the like.

Program Specifics

Since a sound knowledge of mathematics underlies quantitative work in all fields, a Core of mathematics is required of all CQS students. The Core Program consists of the equivalent of five semester courses in mathematics, including third-semester calculus, finite mathematics (logic and sets, probability, vectors and matrices, with applications), and three semesters of work chosen from among the following:

differential equations and advanced calculus;
probability theory;
numerical analysis;
projective geometry and linear algebra;
function theory.

Other courses, such as number theory, logic, abstract algebra and topology may be substituted for some of the above-listed courses.

In his areas of principal and supplementary interest, the student will take the equivalent of 6 to 8 semester courses in related fields (for example, economics, chemistry, psychology, and/or more mathematics), and 2 to 4 semesters of project and problem work. The allocation of time within the above broad outline may vary considerably according to the individual student's interest. The principal and supplementary interests may be mathematics itself or closely related fields (astronomy and nuclear physics, for example), or they may be quite different, such as astronomy and psychology.

The quantitative portion of the student's program is equivalent to 15 semester courses during the three-year period, out of a total of about 25. Thus, about 60 per cent of his time is so accounted for, leaving 40 per cent to be devoted to generalization. It is customary for him to generalize rather broadly in his Sophomore year, and in the Junior and Senior years to pursue to greater depth a generalization subject which takes his interest.

Students are expected to follow generally the outline set forth above, but the Directors of Studies have great freedom to make allowances for individual differences. While the allocation of time has been stated in terms of course equivalents, there is no requirement that the work be done through formal courses. The regular University courses may be elected, or the student may learn through tutorials and independent study, as appropriate to his program.

Junior Qualifying Examination

In May of his Junior year, each student takes a 12-hour written examination of which 9 hours are in the quantitative area of Core, Principal and Supplementary interests, and 3 hours are on the Generalization. The 9 hours may be allocated in various ways, but at least 3 hours are required to be in the Core, and at least 3 hours in the Principal interest. The examinations are planned on the basis of short essays written by each student, setting out the areas which he proposes to offer. His statement is discussed with the Directors of Studies if modification or clarification seems necessary.

The performance of each student is evaluated as "honors," "creditable" or "fail" by the examiners. The evaluation is based principally on the result of the examination, but other evidence may also be used, such as papers and reports which the student has prepared during his College career, including project reports.

A student receiving a grade of "fail" may be permitted to continue in CQS subject to conditions stipulated by the Directors of Studies. Such continuation is exceptional, and is likely to involve creditable performance on a make-up examination written before the start of the senior year.

Senior Comprehensive Examination

Near the start of his last semester at Wesleyan, the student is asked to submit a Senior Essay describing what he has learned and what he perceives to be the significance of, and the relationships among, the topics which he has studied.

Early in May, the student takes a written comprehensive examination in his quantitative studies, set by outside examiners and based on Wesleyan courses, independent study, and the Senior Essay. Shortly after the middle of May, the student stands an oral examination running about one and one-half hours and consisting generally of three parts:

(1) Thirty minutes on mathematics;

(2) Thirty minutes on a related field of the student's choosing, as specified in his Essay;

(3) Thirty minutes on "generalization," in an area or in areas specified by the student in his Essay.

The oral examiners will be

(A) Those who set the written examinations; Wesleyan faculty members who have not had the student in courses or seminars; and Fellows of Wesleyan's Center for Advanced Studies;

(B) other Wesleyan faculty members, including the CQS Directors of Studies.

All may join in asking questions, but the evaluation is based solely on the collective judgment of the individuals in (A). The examiners grade the candidate as "Honors," "Creditable" or "Fail."

The final evaluation of the student is made by the Directors of Studies. Among items which may be used by the Directors of Studies in coming to their decision are

(1) the Senior Comprehensive Examination;

(2) the Junior Qualifying Examination;

(3) miscellaneous documents: the Senior Essay, and any other essays which the student chooses to submit; reports on project activity; reports of laboratory work; a Distinction paper; etc.

(4) oral reports which the student has made during his years in CQS.

The Directors of Studies may assign evaluations of

High Honors

Honors

Creditable

Fail.

Staff

The College is supervised by several Directors of Studies, who have the responsibility of working with the students in the College to formulate meaningful total programs, of establishing evaluative techniques to judge student performance, of arranging for lectures, seminars, colloquia, projects, and similar aspects of the College's activities, and of recommending students to the Wesleyan faculty for the B.A. degree. In addition to the Directors, who participate in some of the teaching in the College, there are faculty members from the departments of the University's Division III, and Economics, directly concerned with the problem, project, and assisting work of the College.

Projects

Each student is expected to participate in at least one project, with a time equivalent of about two semester courses. In this, the student works in a planned and purposeful manner on a real problem which constitutes for him an application of his principal interest. Thus, for one primarily interested in abstract mathematics, to attack a problem in theoretical physics, with physical content, may be an application. A student whose principal interest is physics might, instead, find an application in instrument design to function under practically-imposed constraints.

Each project is organized under a faculty supervisor, and may include one or several students. Students are exposed to the practical need to be met, and part of their work lies in recognizing and formulating these problems, as well as in seeking solutions. The sources of projects are varied. They may come from many Departments in the University, and from business, industry, and government activities in the Middletown area.

Written and Oral Communication

Considerable practice in writing and speaking is required of CQS students. Each year at least one oral report on some aspect of his work is presented to the CQS membership by each student, and further experience in oral expression comes through informal reports, through classroom presentations, and through interviews with the Directors of Studies.

In addition to written progress and summary reports on problem and project work, each student submits a report of general progress at the end of each semester. At their discretion, the Directors of Studies may require further written reports of some students.

It is expected that CQS students will acquire at least a reading knowledge of a foreign language.

Assisting

Each CQS student is expected to contribute an average of 1 1/2 hours per week of work to Wesleyan. Grading of homework papers, directing help sessions, assisting with problem sessions, serving on CQS standing committees, being on call

at the Computer Laboratory to instruct in the use of the machine and to help program problems brought in by faculty or students, acting as departmental or faculty assistants (especially in the laboratory sciences)--these are typical of the jobs which may be undertaken.

March 21, 1963